

Nursing Home Staffing Standards: Their Relationship to Nurse Staffing Levels

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Purpose: This study reviews staffing standards from the 50 states and the District of Columbia to determine if these standards are related to nursing home staffing levels. **Design and Methods:** Rules and regulations for states' nursing home staffing standards were obtained for the 50 states and the District of Columbia. Nurse staffing data were obtained from the Centers for Medicare and Medicaid Services On-Line Survey, Certification, and Reporting (known as OSCAR) database. The minimum hours per resident day (HPRD) staffing standards for each state were categorized according to the following: no state-specific HPRD standard (adheres only to federal staffing guidelines); low HPRD standard (≤ 2.5 HPRD); and high HPRD standard (> 2.5 HPRD). A series of hierarchical linear models examined the relationships between state staffing standards and actual facility staffing (total, licensed, and certified nurse aide HPRD), using a number of covariates. **Results:** The variance in facility staffing was much greater within than between states. Facilities in states with high staffing standards had somewhat higher staffing than states with no standards or low standards, whereas facility staffing in states with low standards was not significantly different from that in states with no standards. Other factors, such as resident acuity and average state Medicaid rate, also were related to staffing. **Implications:** State staffing standards may not be effective policy tools because they are only one of many factors that affect facility staffing levels. Setting a low minimum HPRD standard may fail to

raise staffing, or it may even have a dampening effect on staffing rates in facilities.

Key Words: Staffing levels, Quality of care, Nursing home, State standards, Policy

Adequate nurse staffing in nursing homes is considered to affect quality of care and life for residents. Recent reports from the Centers for Medicare and Medicaid Services (CMS; 2001a, 2001b) examining the appropriateness of minimum nurse staffing ratios associated critically low ratios of nursing staff to residents with placing nursing home residents at substantially increased risk of problems related to quality.

Federal legislation regarding nurse staffing in nursing facilities has not been updated since 1987. The Nursing Home Reform legislation in the 1987 Omnibus Budget Reconciliation Act (OBRA) requires that a nursing facility certified for Medicare and Medicaid "have sufficient nursing staff to provide nursing and related services to attain or maintain the highest practicable physical, mental, and psychosocial well-being of each resident in accordance with a written plan of care" (OBRA, 1987). The legislation further requires that facilities have a licensed nurse 24 hr/day, 7 days/week, and that at least 8 hr be from a registered nurse (RN). Facilities' adherence to this requirement for participation in the Medicare and Medicaid programs is evaluated through each state's survey process.

The adequacy of the federal regulations regarding nurse staffing has long been criticized by consumer groups and professional nursing organizations, who have advocated for better staffing by mandating specific staffing ratios for nursing facilities (American Nurses Association, 2002; McKeon, 2001; National Citizen's Coalition for Nursing Home Reform [NCCNHR], 2001). An expert panel, convened by the John A. Hartford Foundation Institute for Geriatric Nursing in 1998 and consisting of consumer advocates, health economists, and health services researchers knowledgeable about nursing homes, and

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nurse researchers, educators, and administrators in long-term care, recommended a minimum of 4.55 hr of nursing care each day for each resident and noted that staffing rates had to be adjusted upward for residents with higher acuity needs (Harrington et al., 2000).

A number of states have legislated additional nurse staffing requirements for nursing facilities. Not long ago, the NCCNHR posted a summary of states' nursing home staffing standards to their Web site (NCCNHR, 1999). Harrington (2004a, 2004b) recently analyzed states' staffing standards and found that actual nurse staffing levels in nursing homes were higher than state minimum standards.

Our purpose in this study was to comprehensively review staffing standards for the 50 states and the District of Columbia and to determine if staffing standards were related to nursing home staffing levels. Our study goes beyond Harrington's work (2004a, 2004b) by specifying and testing a hierarchical linear model for the relationship between staffing standards and facility staffing levels while controlling statistically for covariates. Covariates were state and facility characteristics derived from the CMS On-Line Survey, Certification, and Reporting (OSCAR) database that might affect facility staffing and might vary systematically between states. Previous research has found that higher nurse staffing was associated with lower bed size (Cohen & Spector, 1996; Zinn, Weech, & Brannon, 1998), lower occupancy rate (Harrington & Swan, 2003), nonprofit ownership (Aaronson, Zinn, & Rosko, 1994; Harrington, Carrillo, Mullan, & Swan, 1998; Harrington & Swan; Kanda & Mezey, 1991), lower percentage of Medicaid residents (Harrington & Swan; Kanda & Mezey), and location within a hospital (Harrington & Swan). We also included the average state Medicaid-reimbursement rate as a covariate because of its relationship to both staffing and quality of care (Grabowski, 2001, 2004; Grabowski & Angelelli, 2004).

The research questions investigated for this study were as follows: (a) What are the characteristics of state staffing standards in the United States? and (b) Are state staffing standards associated with nursing staff hours per resident day (HPRD), licensed HPRD, and unlicensed HPRD? We report results for facilities that were either dually certified for Medicare and Medicaid or were certified for Medicaid only. We excluded Medicare-only facilities because they serve specialized postacute populations requiring high staffing levels. Although covered by state standards, their staffing is not likely to be sensitive to these standards.

Methods

We obtained the rules and regulations for nursing home staffing standards for the year 2004 in the

50 states and the District of Columbia through each state's government Web site. In addition, we checked each state's Web site to determine if there was any pending legislation related to nursing home staffing. We contacted the states' departments of health or human services if the rules or regulations were not available through the Internet or if there were questions about the rules or regulations. Because there was significant variation in the rules and regulations regarding nurse staffing for each state, we abstracted and organized the information into major categories as follows: (a) HPRD by total staff and differentiated by type of staff; (b) ratio staffing by total staff and differentiated by type of staff; (c) staffing according to bed size or census by total staff and differentiated by type of staff; (d) licensed nurse staffing requirements; (e) specific staffing requirements for RNs; (f) waivers to staffing requirements; and (g) no additional requirements; follows federal guidelines for staffing.

We obtained data on actual nursing home staffing for the year 2004 from the OSCAR database. This CMS database includes self-reported staffing data for a 2-week time period from all certified nursing facilities in the United States. Survey dates for the facilities in the database ranged from January 2003 to September 2004. The database provides the average nursing hours per resident day for all nursing staff as well as hours differentiated by type of nursing staff. The database included 16,171 nursing facilities. We eliminated facilities in Guam, the Virgin Islands, and Puerto Rico from the database (8 facilities). We "cleaned" the database by deleting facilities that were duplications (4 facilities); missing data for number of RNs, licensed practical nurses (LPNs), certified nurse aides (CNAs), and total nursing staff (122 facilities); top 1% of RN, LPN, CNA, or total nursing hours among dually certified or Medicaid-only facilities (380 facilities); lowest 1% of total licensed (RN + LPN) or total nursing staff hours (265 facilities); non-hospital-based facilities with number of residents greater than number of beds (139 facilities); facilities with occupancy rates less than 40% (154 facilities); and facilities that did not have an inspection date matching to within 2 months of the date recorded in the main staffing hours file (where acuity of the nursing home was assessed). This data-cleaning procedure left 14,940 facilities in the database. After we eliminated facilities certified for Medicare only and facilities with survey dates prior to January 1, 2003, the final sample consisted of 14,147 facilities.

Analysis

Our main analysis involved fitting hierarchical linear models (HLM) with HLM 6.0 software (Raudenbush, Bryk, & Congdon, 2004). While controlling for covariates, we investigated how the

HPRD staffing standard and licensed nurse staffing standards were related to total staff hours, CNA hours, and licensed staff hours per resident day. We fitted two-level (level 1 = facility and level 2 = state) intercepts-as-outcome models with all independent variables entered as fixed effects (Raudenbush & Bryk, 2002). The HLM approach is appropriate for these data because facilities are nested within states; the variables of interest are at both the facility level (actual staffing) and state level (staffing standard). An ordinary least squares regression at the facility level (i.e., assigning a state staffing-standard score to each facility) would have resulted in biased standard errors for the state-level variables. If we had aggregated data to the state level and performed ordinary least squares regression ($n = 51$), we would have lost valuable information about facility variation in staffing and other characteristics.

The HLM model specified relationships between (a) staffing-standard variables—staffing HPRD standard, licensed nurse requirement (presence or absence), and 24-hr RN requirement (presence or absence); (b) mean actual facility nurse staffing—total nursing HPRD, licensed staff HPRD, and for aide staff HPRD; and (c) covariates. We created a categorical variable for the state HPRD standard. We categorized states as no HPRD standard, an HPRD standard at or below the mean state standard (≤ 2.5 HPRD), and an HPRD standard above the mean state standard (> 2.5 HPRD). Creating a categorical variable allowed us to test for a nonlinear relationship between staffing standard and staffing level. Treating the state HPRD standard as a continuous variable would have required a more complex model to test for nonlinearity. We scored the presence or absence of licensed staff or 24-hr RN standards as 0 = absence, 1 = presence, and 2 = specified number of beds. The facility distributions on total staff hours per resident day, aide hours, and licensed staff hours were somewhat skewed. We used a log transformation of these variables to correct for this problem.

Covariates included in the HLM models were nursing home size, type of Medicare or Medicaid certification, percentage of Medicare residents, percentage of private pay or other residents, hospital affiliation, chain affiliation, percentage occupancy, ownership (for profit, nonprofit, or government), and a resident acuity score derived from resident characteristics from the OSCAR file. We obtained average 2002 state Medicaid rates from published sources (Grabowski, Feng, Intrator, & Mor, 2004). We calculated the acuity index (Cowles, 2002), and it takes into account the proportions of facility residents who have dependencies in activities of daily living; are bedfast or chair bound; or require respiratory care, suctioning, intravenous therapy, or tracheotomy care. The mean acuity index score for facilities in the data set was 10.19 ($SD = 1.47$; range = 3.46 – 21.23). We measured the HPRD standard,

Table 1. Nursing Facility Sample by Staffing Variables and Covariates ($N = 14,188$ Facilities)

Study Variables	%	<i>M</i>	<i>SD</i>
State HPRD staffing standard			
No standard	30		
HPRD ≤ 2.5	40		
HPRD > 2.5	30		
State licensed standard			
No	24		
Yes	76		
State 24-hour RN standard			
0	78		
1	7		
2	15		
Ownership			
For profit	68		
Government	6		
Nonprofit	26		
Chain affiliated	53		
Hospital affiliated	6		
Certification			
Medicare and Medicaid	92		
Medicaid only	8		
Hours per resident day			
Licensed hours		1.26	0.45
Aide hours		2.31	0.56
Total hours		3.57	0.80
LOG licensed hours		0.078	0.132
LOG aide hours		0.351	0.111
LOG total hours		0.542	0.094
Percent Medicare	11%	11%	
Percent private pay and other	23%	17%	
Acuity index	10.19	1.47	
No. of residents	95	59	
Log number of residents	1.91	0.25	
State Medicaid payment rate ($n = 50$)	\$118.19	\$23.79	

Notes: HPRD = hours per resident day; RN = registered nurse. For the table, $N = 14,188$ facilities.

licensed staff, and 24-hr RN standards and state average Medicaid rate at the state level (Level 2); we measured all other variables at the facility level (Level 1). We centered all continuous independent variables on their respective sample means (i.e., grand mean centered) for analysis.

Table 1 shows the descriptive statistics for facilities in the analysis data set. Of the facilities, 30% were in states with no HPRD standards, 40% were in states with a standard at or below 2.5 HPRD, and 30% were in states with a standard above 2.5 HPRD. Seventy-six percent of facilities were in states with a licensed staff standard, whereas 22% were in states with a 24-hr RN staffing standard. Across all facilities the mean total actual HPRD was 3.57; the mean for licensed staff was 1.26 HPRD; and the mean for CNAs was 2.31 HPRD. About two thirds of facilities were for profit, slightly over half were chain affiliated, and only a fraction (6%) were hospital affiliated. Ninety-two percent of facilities were dually

Table 2. List of States by Staffing Standards

State	Staffing Standards			
	Follow Federal Guidelines	Licensed Staffing Standard	24-Hour RN Staffing Standard ^a	HPRD Staffing Standard
AK	No	Yes	Yes*	—
AL	Yes	No	No	—
AR	No	Yes	No	3.10
AZ	Yes	No	No	—
CA	No	Yes	Yes*	3.20
CO	No	Yes	Yes	2.00
CT	No	Yes	Yes	1.90
DC	No	Yes	Yes	3.50
DE	No	Yes	No	3.28
FL	No	Yes	No	3.60
GA	No	Yes	No	2.00
HI	No	Yes	Yes	—
IA	No	Yes	No	2.00
ID	No	Yes	No	2.40
IL	No	Yes	No	2.50
IN	No	Yes	No	—
KS	No	Yes	No	2.00
KY	Yes	No	No	—
LA	No	No	No	2.35
MA	No	Yes	No	2.60
MD	No	Yes	Yes	2.00
ME	No	Yes	No	2.93
MI	No	Yes	No	2.25
MN	No	No	No	2.00
MO	No	Yes	No	—
MS	No	Yes	No	2.80
MT	No	Yes	Yes*	1.84
NC	No	No	No	2.10
ND	Yes	No	No	—
NE	Yes	No	No	—
NH	Yes	No	No	—
NJ	No	Yes	No	2.50
NM	No	No	No	2.50
NV	Yes	No	No	—
NY	Yes	No	No	—
OH	No	Yes	No	2.75
OK	No	No	No	2.41
OR	No	Yes	No	1.65
PA	No	Yes	Yes*	2.70
RI	No	Yes	Yes	—
SC	No	Yes	No	1.87
SD	Yes	No	No	—
TN	No	Yes	Yes	2.00
TX	No	Yes	No	—
UT	Yes	No	No	—
VA	Yes	No	No	—
VT	No	No	No	3.00
WA	No	Yes	Yes*	—
WI	No	Yes	No	2.25
WV	No	Yes	No	2.25
WY	No	No	No	2.25

Notes: HPRD = hours per resident day; RN = registered nurse. For the table, $N = 51$.

^aFor this column, data with an asterisk have a 24-hour RN staffing requirement based on number of beds in facility. Those states marked “yes” but without an asterisk do not have a bed requirement.

certified Medicare and Medicaid. The facility average for percentage of Medicare residents was 11%,

whereas the average private-pay and other residents was 23%. The facility average acuity score was 10.19 and the average number of residents was 95. The state average per diem Medicaid payment rate was \$118.19.

Results

Staffing Standards

Table 2 summarizes the staffing standards for each of the 50 states and the District of Columbia. Only 11 states (21.5%) had no additional staffing requirements beyond the federal requirements. Of the 40 states having additional staffing requirements, 33 specified a minimum number of nursing care hours or staff-to-resident or resident-to-bed ratio for a 24-hr period. These staff-to-resident ratios and resident-to-bed ratios, expressed as HPRD, are reflected in Table 2. The median HPRD staffing standard requirement for the 33 states was 2.35. Florida had the highest HPRD requirement (3.60 HPRD) and Oregon had the lowest (1.76 HPRD).

Montana, with only 88 facilities (included for the HLM analysis), has the most complex requirements in that it specifies staffing by bed size, type of staff, and by work shift. Thirteen states had staffing requirements that were specific to work shifts of nursing staff; that is, there was a requirement for the number of nursing staff to be on each shift. Only one state (New Jersey) had a staffing standard that took into account the acuity level of a resident. New Jersey required that each resident receive a minimum of 2.5 hr of nursing care/day. However, additional hours were prescribed for residents who needed special treatments or advanced care (e.g., head trauma, wound care, or nasogastric or gastrostomy tube feedings). Licensed nurse staffing requirements were found in 33 (65%) states, and 7 of those 33 states require a 24-hr RN. Five additional states require a RN 24 hr/day based on the number of beds in the facility. Most waivers related to the licensed nurse staffing requirement.

HLM Analysis of Facility Staffing Levels

Before fitting the HLM models, we examined the amount of variation in actual facility HPRD within and between states. The intraclass correlations (between-state variance as a proportion of total variance) for the unconditional model with no variables entered as fixed effects indicated that about 81% of variance in facility-level total HPRD and licensed staff HPRD was within states and only 19% was between. For aides, about 86% of variance was within state and 14% was between states. Thus, facility HPRD staffing varied a great deal more within than between states.

We fitted separate models for total HPRD, licensed HPRD, and aide HPRD. The presence of a state licensed staffing standard or a 24-hr RN staffing standard was not significantly associated with total,

Table 3. Results from Hierarchical Linear Model Analysis

Independent Variables	LOG Total Actual HPRD			LOG Licensed Actual HPRD			LOG Aide Actual HPRD		
	Estimate	SE	Significance	Estimate	SE	Significance	Estimate	SE	Significance
Intercept	0.5821	0.0057	0.000	0.1065	0.0093	0.000	0.3600	0.0049	0.000
State staffing standards									
High HPRD standard > 2.5	0.0239	0.0093	0.014	-0.0269	0.0153	0.084	0.0223	0.0136	0.106
Low HPRD standard ≤ 2.5	-0.0087	0.0076	0.260	-0.0074	0.0126	0.556	-0.0078	0.0111	0.486
Average state Medicaid rate	0.0008	0.0001	0.000	0.0012	0.0002	0.000	0.0005	0.0002	0.001
Covariates									
Facility occupancy (%)	-0.0008	0.0001	0.000	-0.0014	0.0001	0.000	-0.0004	0.0001	0.000
Facility Medicare (%)	0.0013	0.0000	0.000	0.0030	0.0001	0.000			
Facility private pay (%)	0.0006	0.0000	0.000	0.0006	0.0001	0.000	0.0007	0.0001	0.000
Acuity index	0.0121	0.0005	0.000	0.0115	0.0007	0.000	0.0122	0.0006	0.000
LOG number of residents	-0.0470	0.0030	0.000	-0.1044	0.0043	0.000			
Hospital based	0.0318	0.0031	0.000	0.0777	0.0043	0.000			
Certified Medicaid only				-0.0139	0.0038	0.000			
For-profit ownership	-0.0375	0.0017	0.000	-0.0349	0.0023	0.000	-0.0361	0.0021	0.000
Government ownership	0.0140	0.0030	0.000	0.0095	0.0042	0.024	0.0163	0.0038	0.000
Chain owned	-0.0195	0.0014	0.000	-0.0046	0.0019	0.019	-0.0265	0.0018	0.000
Unconditional model variance									
Level 1 (facility)	0.00738			0.01466			0.01065		
Level 2 (state)	0.00170			0.00336			0.00166		
Fitted model residual variance									
Level 1 (facility)	0.00585			0.01106			0.00956		
Level 2 (state)	0.00051			0.00142			0.00110		
Reduction in residual variance (%)									
Level 1 (facility)	21			24			10		
Level 2 (state)	70			58			34		

Notes: HPRD = hours per resident day; SE = standard error.

licensed, or aide HPRD. Therefore, we fitted models without these variables. Results from the final HLM models are presented in Table 3. These models contrast states having a high or low standard with the reference category of states having no standard. Facilities in states with high staffing standards (> 2.5 HPRD) had significantly higher total staffing than facilities in states with no standard; however, there was no significant difference between high and no standard states in the separate models with licensed and unlicensed staffing. Facilities in states with low standards (≤ 2.5 HPRD) were not significantly different in total, licensed, or unlicensed staffing when compared with states with no standards. In another set of models (not reported in the tables), we entered the same variables, but this time we contrasted high and no standard states with low standard states. Facilities in states with high standards had significantly greater total ($p = .001$), licensed (.027), and unlicensed staffing (.05) than facilities in states with low standards.

Table 4 shows these relationships more clearly by presenting the estimated marginal means for HPRD (transformed from log hours into hours) by staffing standards when evaluated at the mean values of the continuous covariates and zero values of the dichotomous covariates. Because all covariates in the fitted models were centered on their respective means, we

were able to compute estimated marginal means directly by inserting mean values into the equation (intercept and coefficients) for each model. Facilities in states with low HPRD standards had the lowest average total, licensed, and aide HPRD; facilities in states with high HPRD standards had highest total, licensed, and aide HPRD; and facilities in states with no standards were in between.

Most of the covariates were related to staffing in the predicted direction. Higher facility staffing was associated with lower occupancy percentage, higher percentage of Medicare or private pay, being hospital based, having a smaller number of beds, having nonprofit ownership, and not being part of a chain. State Medicaid payment rate also had a significant positive coefficient; higher state Medicaid rates were related to facility staffing level. The models fit the data very well. Compared with the total variance in the unconditional model, the fitted models reduced facility-level (Level 1) residual variance in total hours by 21%, licensed hours by 24%, and unlicensed hours by 10%. The state-level (Level 2) fitted models reduced residual variance in total HPRD by 70%, licensed hours by 58%, and unlicensed hours by 34%. In preliminary models (not reported in the table) in which state staffing standards were the only independent variables, the Level 2 (state) reduction in residual variance was only 11% for total hours,

Table 4. Estimated Marginal Mean Facility HPRD
(N = 14,188)

State Standards (<i>n</i> = no. of facilities)	HPRD Estimated Marginal Means		
	Total HPRD	Licensed Nurse HPRD	Aide HPRD
Low HPRD standard ≤ 2.5 (<i>n</i> = 6,023)	3.74	1.26	2.45
No HPRD standard (<i>n</i> = 4,445)	3.82	1.28	2.49
High HPRD standard > 2.5 (<i>n</i> = 4,472)	4.04	1.36	2.63

Notes: HPRD = hours per resident day. For the table, N = 14,188 facilities.

8% for licensed hours, and 5% for aide hours. Thus, a very large proportion of variance in staffing between states can be attributed to state Medicaid-payment rates and facility-level covariates.

Discussion

Neither the research literature, the reports from the Institute of Medicine (1996, 2001), nor the reports from the CMS on appropriate minimum staffing ratios for nursing homes (CMS, 2001a, 2001b) thoroughly examines the relationships between state staffing standards and actual nurse staffing in nursing facilities. It is assumed, perhaps naively, that simply introducing a staffing standard will lead to increased staffing levels and ultimately improved quality care. In fact, nursing home staffing levels vary a great deal more within states than between them, and facility characteristics such as average resident acuity, payer mix, size, and ownership type explain at least part of this variation. Neither state licensed staffing standards nor 24-hr RN staffing standards was associated with higher actual staffing. HPRD staffing standards had a significant relationship to staffing, but it was not consistently positive.

Introducing a high HPRD staffing standard may increase facility staffing; however, a low standard may have no affect or even a dampening effect. Some facilities may treat staffing standard minimums as if they were maximums, and lower their staffing accordingly. Medicaid-reimbursement rate, another potential policy tool, had a significant positive relationship to staffing. The causal relationships between Medicaid rate, staffing standards, and facility staffing are probably quite complex. On one hand, high Medicaid rates may encourage higher staffing. On the other hand, increases in staffing expenditures may lead to Medicaid-rate increases in states where rates are set according to historical costs. Similarly, states introducing new or higher staffing standards may face political pressure to raise their rates. The politics of setting staffing and payment policy and

the diverse perspectives of the nursing home advocates and industry are critical factors that we could not measure in our study.

Staffing standards are intended to ensure a minimal level of safe care. Nevertheless, determining the appropriate required staffing level is challenging. Although 11 of 33 states had a minimum HPRD requirement greater than 2.50, only 1 state (Florida) had a required HPRD (3.6 HPRD) close to the HPRD proposed by an expert panel (4.55 HPRD) or nurse staffing threshold that was identified by the CMS to be associated with quality measures or indicators (4.1 HPRD; see Table 2). States that adopt low minimum staffing standards may run the risk that at least some facilities will “staff down” to these levels.

Our findings indicate that state staffing standards or other state-level characteristics may have only a secondary influence on facility staffing. Facility staffing may be highly influenced by facility characteristics such as the acuity of the residents, certification, facility size and layout, proprietary status, and geographic location. Staffing standards per se accounted for only a small proportion of between-state variance in facility staffing levels (11% of total HPRD). Statistical models that included Medicaid-payment rate and facility-level covariates did a much better job of accounting for between-state variance (70% of total HPRD). Even in our fully fitted model, with state- and facility-level covariates, the residual variation in facility staffing within states was substantial (79% of total HPRD left unexplained). Other facility characteristics, such as management style or labor market conditions, that were not measured in our study may explain some of this variation. Many of these factors may be difficult to affect through state policy initiatives.

Resident acuity should be considered when standards are set because of case-mix differences between facilities. Many states' case-mix reimbursement systems pay a higher direct-care rate for facilities that have higher acuity (Job & Kus, 2003). State staffing standards that focus only on HPRD requirements and do not consider the acuity of residents could run counter to the Medicaid-payment system and lead to quality-of-care concerns for nursing home residents. The expert panel proposing minimum staffing standards recommended that the staffing levels should be adjusted upward for residents with higher intensity of needed nursing care (Harrington et al., 2000). An acuity-based staffing standard could be developed from the 1990–1991 and 1995–1997 CMS staff time data used to create the Resource Utilization Group–III (RUG-III) case-mix classification system (CMS, 2004). Four states (Minnesota, Indiana, Colorado, and Mississippi) have conducted their own staff time studies as part of implementing the RUG-III case-mix classification system for their Medicaid-payment system. The staff time data from these states also could be used to create acuity-based staffing models.

This study has two important study limitations. First, the cross-sectional design makes it very difficult to make causal statements about the effect of staffing standards or covariates on facility staffing. Second, we rely heavily on CMS OSCAR data, the accuracy of which has been called into question (CMS, 2001d; Schnelle, 2004). Our data-cleaning procedures helped to improve data accuracy, but undetected errors still may have been present.

More research is needed to provide states with guidance in determining nurse staffing standards that will lead to quality care for residents. Studies examining the relationship between nurse staffing and quality in nursing homes provides mixed and often weak evidence that the amount of nursing staff alone is the key factor contributing to quality outcomes for residents. Several observational studies have found that staffing-related factors such as the way nursing care is organized and delivered, the use of technology, and leadership and supervision can have a positive impact on quality outcomes for residents. Thus, the way nursing staff is organized or general working conditions in the facility may be more strongly related to care quality than the number of staff members. Finally, even if a clear relationship can be established between staffing and care quality, there are cost implications of implementing new nurse staffing standards because of the current pressure to reduce public expenditures for nursing home care. Nursing home staffing may be increased in ways other than regulatory strategies. Several state Medicaid-reimbursement systems are being revised to provide quality incentives. Staffing ratios—HPRD and other staffing measures can be used as quality incentives in such systems. The demand for quality nursing home care by the baby boomer generation, the future consumers of nursing home services, is likely to influence the number and type of nursing staff in nursing homes. Nonetheless, we should increase our understanding of how the amount and organization of staffing relates to the quality of nursing home care, and the ways in which nursing homes are likely to respond to regulations, reimbursement incentives, and market forces.

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